

EPA Comments on
SURFACE WATER, GROUNDWATER, and SOLID PHASE MEDIA
INVESTIGATION WORK PLAN for
MAYFLOWER MILL & TAILINGS IMPOUNDMENTS AREA

EPA has reviewed the “Surface Water, Groundwater and Solid Phase Media Investigation Work Plan of the Mayflower Mill and Tailings Impoundment Area” submitted by Sunnyside Gold Corporation (“Sunnyside”) on July 14, 2015. At the same time, Sunnyside submitted a separate work plan for “Subsurface Investigation Work Plan for the Mayflower Mill and Tailings Impoundment Area.” While Sunnyside submitted them as separate work plans they are related.

1. The SAP from a technical standpoint and generally speaking is vague and inconsistent in its objectives. The DQOs are not clear enough to determine a relationship between the goals, the data collection and data analytic approach. It is unclear as to what Sunnyside is trying to accomplish.
2. This work plan would be easier to follow and more complete if certain sections such as Background were provided in the work plan and not simply referenced in another document.
3. **Section 3.1, 3rd sentence** - Please elaborate on what is uncertain regarding the effects on water quality in this area. The data suggests that the effects and potential effects on water quality are well documented and fairly unambiguous in this reach, but the specific sources, as you state, are what's uncertain.
4. **Page 3-3, 4th bullet.** The DQO suggests that concentrations of TAs in groundwater upgradient of the Mayflower Mill and Tailings Impoundments area is needed. It is not clear if the work presented in this WP or the “Subsurface Investigation WP” will be sufficient to address this objective. No upgradient groundwater sampling appears planned.
5. **Section 3.3-**Will the results of the geophysical investigation be used to help interpret this data? It seems relevant. If not, why not? And if so, how will it be incorporated into the analytical approach?
6. **Section 3.3-**Table 4-1 and 4-2 indicate that water quality parameters will not be collected yet they are listed as necessary input here.
7. **Section 3.3, 3rd sentence-**Please provide specifics on what SGC identifies as data gaps. It is difficult to understand the bigger investigation objective without understanding specifically what SGC considers a gap.
8. **Section 3.4 second paragraph** - It is not clear why the temporal boundary ends in 2015. The existing data strongly suggests a mechanism other than surficial runoff (ie GW) is a primary contributor to degraded water quality in the spring (pre-runoff) in the study reach. However well installation is not scheduled until summer/fall of 2015. How will the potential effects of GW on SW in the pre-runoff period of the hydrograph be determined with this

sample design? If the wells are anticipated to be sampled as part of a longer-term monitoring program please indicate that.

9. **Section 3.4** – How will it be decided to expand the spatial boundaries of study area? What criteria will be considered?
10. **Section 3.5** - The analytic approach section stops short of indicating how the analysis will relate to the "Goals of the Study" in section 3.2, how comparisons will be made and what decisions will be made (if any).

For instance- bullet #2 in section 3.5 indicates that the SW data collected in this SAP will be compared to existing data. Presumably this is to address the 2nd and 3rd bullets in section 3.2; how do TA concentrations change across the study reach and how do the TA concentrations change relative to known inputs. If so, it is unclear why a comparison with historical data is warranted or useful. Is the real goal to determine if existing data is representative of current conditions? Or is the goal to add an additional year's worth of data to existing data to evaluate time trends?

Another example-Bullet 5 indicates a comparison of GW and SW results will be done but it does not relate in any apparent way to the goals outlined in section 3.5. Clearly there is benefit in this comparison because, this is the suspected pathway of release into the river, however there is no study goal that indicates the need to determine the GW SW relationship.

Additionally, Sunnyside has only identified seeps on the right hand side of the river for sampling. In terms of understanding all of the sources on metal loading for this reach of the river, are there seeps on the left bank of the river that should be sampled?

Please provide concise description of how the analytical approach will achieve the stated study goals, or if appropriate modify the study goals to more accurately reflect the intent of the study. In addition, please provide more explanation of how measurement errors and related uncertainties for the data collected will be evaluated. Will statistical analysis be part of evaluating errors and uncertainties? If so, what statistical methods will be used?

11. **Section 3.5, second to last sentence** - The sediment results to date (and PW to a lesser degree) are relatively consistent in trend but highly variable in magnitude. GW trends are, to our knowledge, largely unknown. Please describe the logic that will be applied to determine whether the various media described in this media will be sampled "one or more times".
12. **Section 4.1.1, second paragraph** - Why are water quality parameters not being measured?
13. **Page 4-1, Section 4.1.1 and Figure 4-1.** The surface water sampling locations are presented. Figure 4-1 shows that limited data will be collected upstream of the impoundments area. Additional upstream samples should be considered if not available from other work in the area. These samples will provide useful background data for comparisons.

- 14. Section 4.1.2, second paragraph** - Section 3.1 (Problem Statement) and 3.2 (Study Goals) make no mention of determining risk to aquatic life and in fact state explicitly that the PW is to support Nature and Extent investigation. EPA believes that PW measure can support this objective.

If however, the goal is to assess risk, explicitly include that as a study goal and provide the supporting information on how risk to aquatic life will be evaluated, what benchmarks will be used for comparison, how comparisons will be made and demonstrate that detection limits are adequate to achieve this goal for both surface water and sediment.

Additionally, tables 4-1 and 4-2 indicate that water quality parameters will not be collected for PW, GW or SW. These parameter are critical to determining potential risk, likely very useful to assessing GW/SW interactions and necessary in sampling of GW (as indicated in your SOP).

- 15. Section 4.1.3** – Water quality parameters are apparently not being measured which is inconsistent with the attached SOP. How will samplers determine if the well is purged sufficiently to collect a sample without measuring some water quality parameter? Please make the table and SOP and the SAP in general consistent.
- 16. Section 4.1.3** - It is not clear in this SAP or the subsurface investigation SAP what logic or criteria will be used to determine the location of the GW wells and therefore, the adequacy of the investigative approach virtually impossible to determine.
- 17. Page 4-2, Section 4.2.2, editorial.** It is noted that the Media type for the example sample identification in the groundwater section is “SW” instead of “GW”. It should also be noted that the page numbering for section 4.0 is messed up – there are two of the following pages in the 4-1, 4-2 and 4-3. This should be corrected in section 4 of the document as well as in the TOC.
- 18. Section 5.0** – Please indicate whether the data will also be made available electronically and in what form.

Comments on the QAPP are as follows:

- 19.** Sunnyside included a Quality Assurance Project Plan/Sampling and Analysis Plan (QAPP) as an appendix to for the work described in each work plan but did not submit a Crosswalk for either QAPP. EPA requires the preparer of the QAPP to submit a Crosswalk to aid in its review of a QAPP. Since Sunnyside did not submit a Crosswalk, EPA as part of review has completed the Crosswalk and provided its comments concerning the QAPP the Crosswalk. It is requested that Sunnyside provided an explanation for how it addressed each deficient item noted in the Crosswalk including the comments in the “Summary of Comments” and re-submit the Crosswalk when it resubmits the revised work plan including the QAPP. The “Response” date and “Resolved” date should be included in the Comments section of the Crosswalk.
- 20.** A major concern with the QAPP was the lack of a clear understanding of the criteria or

action levels for metals referred to in the plan (and used as a basis for analytical method detection limits). In the QAPP table of contents, Table A-3-2 (Achievable Laboratory Limits and Screening Criteria – Aqueous Samples) and Table A-3-3 (Achievable Laboratory Limits and Screening Criteria – Solid Phase Samples) do not contain screening criteria information. Only Laboratory Method Detection Limits and Laboratory Reporting Limits are provided.

Also in the Work Plan, Table 4-4 lists CDPHE water quality standards for only 3 metals – zinc, cadmium, and manganese. These numbers are footnoted (because they apparently are not table standard values but are derived from a list of criteria) that the numbers are the lowest from a group found in Table 5-2. However, this table does not exist in the work plan.

21. Significant concerns with the QAPP include the following items:

- All SOPs including Laboratory, Sampling Disposal (SOP3) and the Laboratory QMP need to be included as appendices to the QAPP.
- A timeline of activities should be provided.
- Information on indirect measurements should be included.
- Signature lines for EPA's approval (if we enter into an AOC) as well as Sunnyside approval, distribution list, DCN (document control number) and Revision number were also missing.